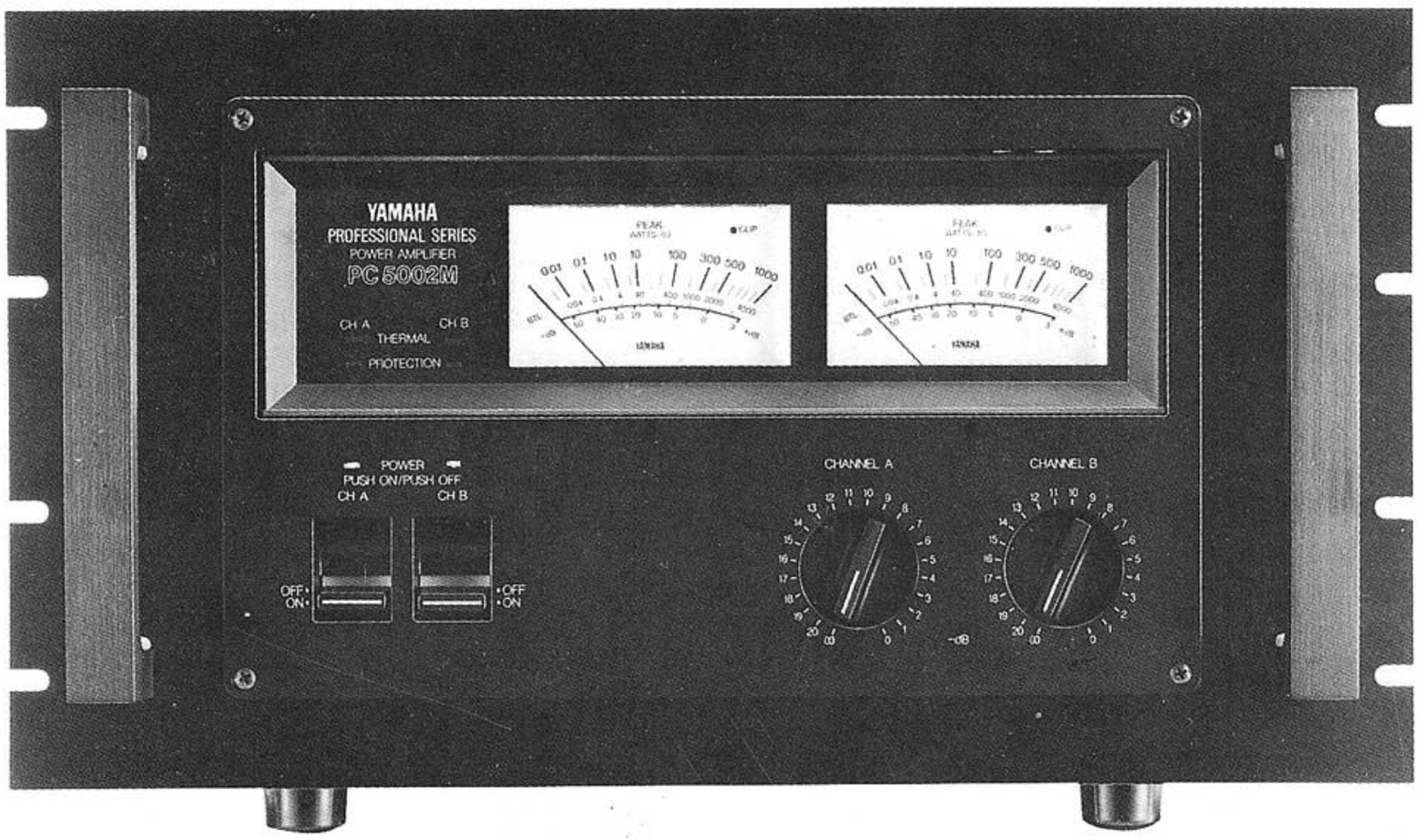
PROFESSIONAL SERIES
POWER AMPLIFIER
PC5002M

OPERATING MANUAL



YAMAHA

ABOUT THIS MANUAL

This amplifier features high power output of 500 watts/channel, or 1500 watts in the monaural mode. Advanced circuitry, including Yamaha's superlative zero distortion rule circuit, make this outstanding performance possible. It is the ideal amp to serve as the center of a state-of-the-art audio component system, while PA equipment is easily connected for professional use.

With careful use, this amplifier will perform flawlessly for many years. Before operating, read this manual carefully, and keep it for future reference.

FEATURES

■ **Highly reliable; designed to meet professional needs**

Specially designed for high reliability, the PC5002M is ideal as a high accuracy, low distortion audio amp or as a large output studio monitor amp. In addition to male and female Cannon connections, screw type input terminals are also provided. Various PA equipment is easily connected for professional use.

■ **ZDR circuitry helps to achieve powerful output of 500 W/ch (8 ohms)**
1500 W/ch (8 ohms) in bridged monaural mode

- It is necessary to have a powerful power-supply section to achieve high power output. The power cord is an ultra-low impedance cord utilizing oxygen-free copper.
- Yamaha's unique ZDR circuitry achieves a large output of 500 W/ch (8 ohms) with only 0.003% distortion.

■ **Twin monaural construction**

The left and right channel amplifiers are completely independent, forming a true "twin monaural" amp configuration. Low power parts are in the upper section, and high power parts in the lower section, and the rational design means signals flow from front to back. The A and B amps have exactly the same characteristics and sound quality, and mutual interference has been held to a minimum.

■ For the wiring of the power stage a dual-sided, through-hole, glass epoxy base and pure copper buss bar, as well as oxygen-free copper are used. All parts are the highest quality and reliability available.

■ The main transformer employs oxygen-free copper wire and a high quality orient core. The unit itself weights 10 kg; for both channels the weight is 20 kg.
The power supply filter capacitor is 150,000μF for each channel, so exceptionally high power is available even down to very low frequencies, and power line irregularities will not affect the audio output.

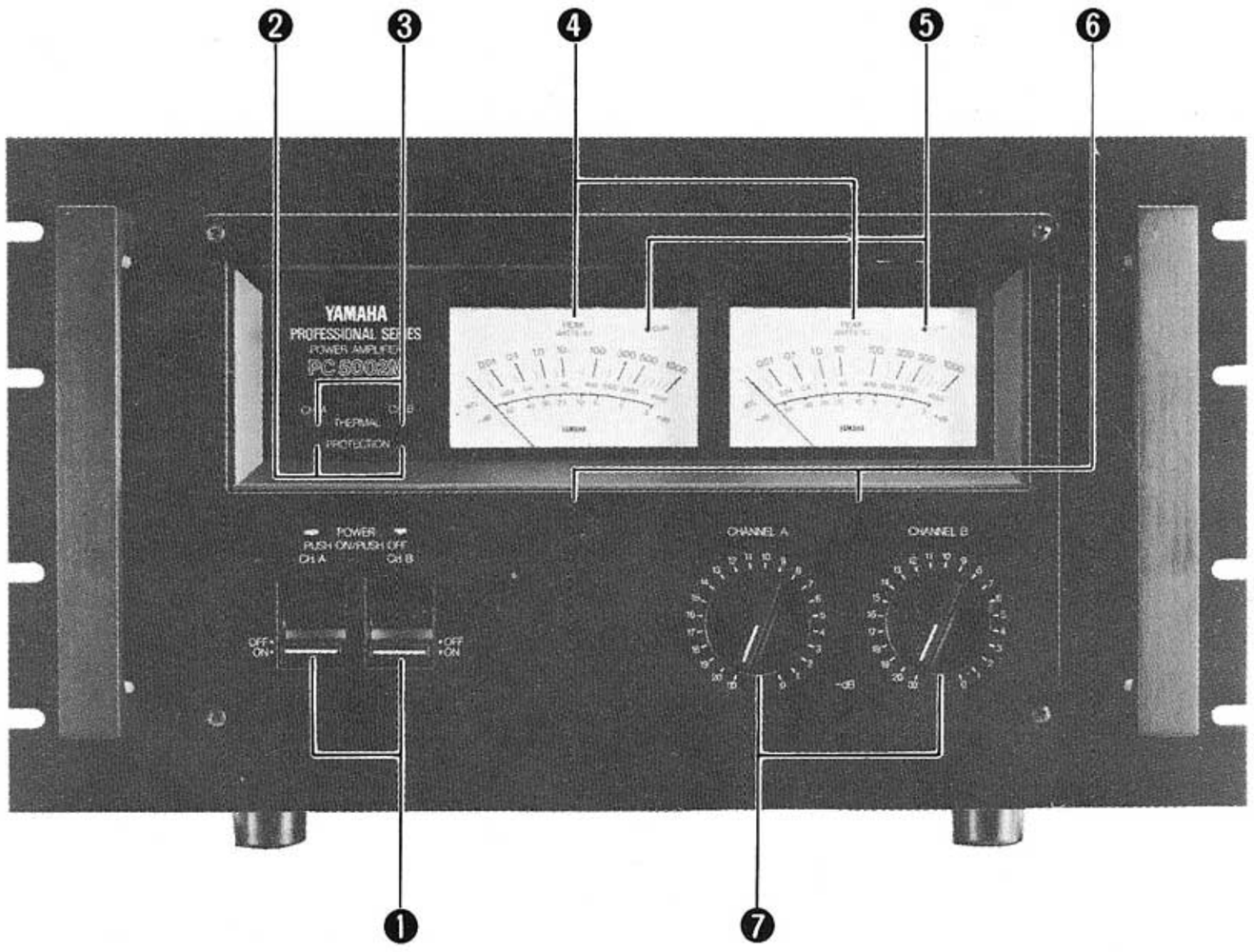
■ **Other Features**

- A surge prevention circuit holds down the current surge which occurs when switching on power.
- Highly accurate, wide range peak level meters with clipping indication.
- Full protective circuitry, including dc offset thermal overload, and current sensing.

NOTE: The U.S. and Canada (U) models have a single 20 amp power cord and plug feeding both channel amplifiers. The European (E) model has separate 15 amp power cords and plugs for each channel amplifier.
Photos in this manual show the European model.

CONTENTS

FRONT PANEL



❶ POWER Switch/Indicator
Channel A and Channel B are independent.
Pressing each switch turns power to the respective amplifier ON and causes the power indicator to light. Pressing the POWER switch a second time turns the Channel OFF.

❷ PROTECTION Indicator
Lights for approximately 4 seconds after power is switched on, indicating that the protection circuitry is active. The speaker outputs are shut off while this indicator is lit. If the protection circuitry is activated for any reason during amplifier operation, the indicator will light and the speaker outputs will be shut off. Once the cause of protection activation has been remedied, normal operation will resume automatically and the protection indicator will go out.

❸ THERMAL Indicator
This indicator lights if surface temperature of the main heat sink exceeds degrees centigrade.

❹ PEAK Level Meters
Indicate the output of each channel. When speaker impedance is 8 ohms, output wattage can be read directly. During bridged mono operation, both channels will show the same output.

❺ CLIP Indicator
The CLIP indicators light when output distortion of the respective channel exceeds approximately 0.5 %. This indicates that the amplifier is clipping due to excessive input signal levels.

❻ Zero Adjust
A small "–" screwdriver is used to adjust the peak meter zero point.

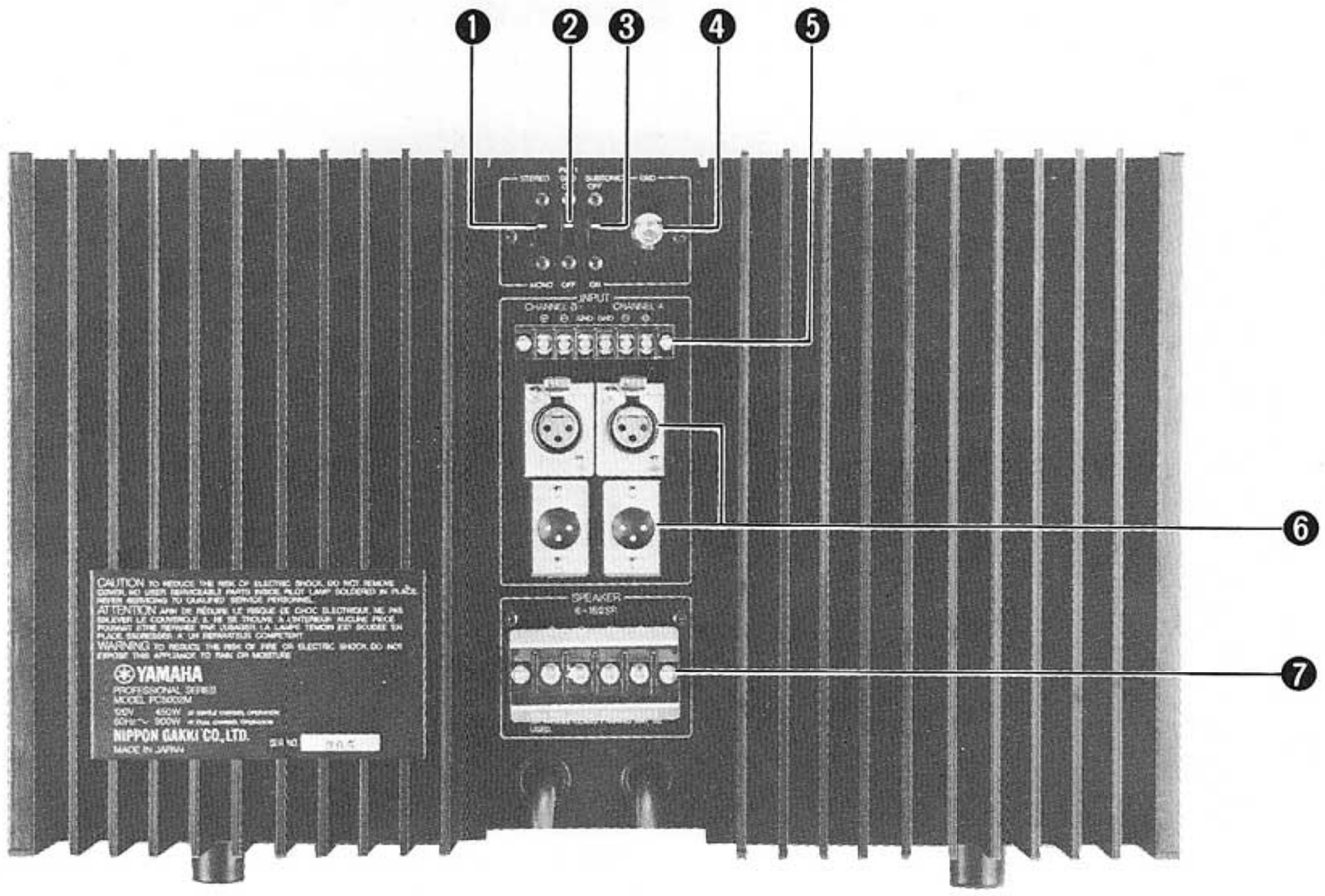
❼ Input Attenuators
These attenuators adjust the sensitivity of the respective amplifier channel in 20 1-dB steps. Attenuation in the fully clockwise position is 0dB, and ∞ in the fully counterclockwise position.
During bridged mono operation, the channel A input attenuator is used.

❽ Knob Lock Adaptors (Supplied)
The Knob Lock Adaptors prevent accidental alteration of attenuator settings once the appropriate setting have initially been made.

CAUTION 〈INSTALLATION AND OPERATING PROCEDURES〉

- Choose the installation location of your PC5002M carefully. Avoid placing it in direct sunlight or close to a source of heat. Also avoid locations subject to vibration and excessive dust, heat, cold or moisture.
- Do not clean the with chemical solvents as this might damage the finish. Use a clean, dry cloth.
- Do not open the cabinet as this might result in damage to the set or electrical shock. If a foreign object should get into the set, contact your dealer.
- When moving the set be sure to first pull out the power plug and remove cords connecting to other equipment.
- The PC5002M weight 61 kg (128 pounds), so careful consideration must be paid to where it will be located. In addition, as it radiates heat, 10 cm (3-¾") of space should be allowed at the back, sides and top. It should be placed in a well ventilated location.
- To prevent damage to speakers when connecting equipment, both power switches should be off.
- When turning off the power, first turn off the power switch for the main unit, then turn off the power for the preamp, etc. Noise will occur in some units when the preamp power switch is turned off.

REAR PANEL



European model

❶ STEREO/MONO Switch

Determines whether the amplifier is to operate in the stereo or mono (BTL) mode.

Note: When this switch is in the Mono position, the output can reach 1.5kW, so the level should be set to the minimum to avoid possible damage to speakers.

❷ PIN 1 GND Switch

Couples or decouples the cannon connector earth line (pin 1, shield). Normally ON. In some cases where ground loops cause excessive hum, turning the ground switch OFF can interrupt the loop and reduce the hum.

❸ SUBSONIC Filter Switch

Cuts out low frequencies under 7 Hz (outside the audible range) at 12 dB/oct. This prevents the distortion which can be caused by warped records.

❹ GND Terminal

This is the ground terminal for the main unit. Refer to instructions on page 4.

❺ INPUT Terminals

These are used as the input terminals when Cannon connectors are not used. In BTL mode, the Channel A input terminal is used.

❻ Cannon Connector

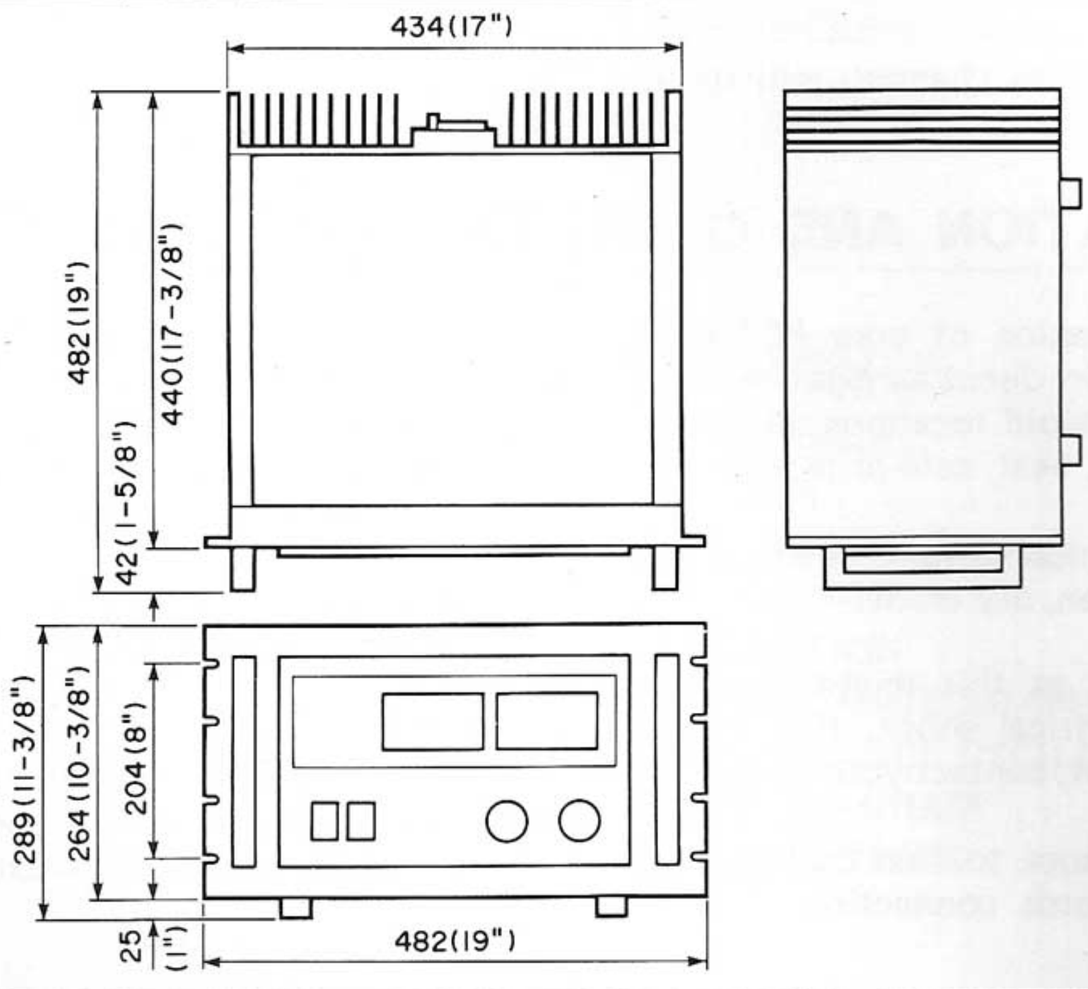
The upper is an XLR-31 type, while the lower is an XLR-32 type. Upper and lower connectors are connected in parallel. Pin 1 is shield, pin 2 is hot and pin 3 cold.

❼ SPEAKER Output Terminals

The two on the right side are for channel A; the two on the left side for channel B.

The SPEAKER terminal is connected to the "+" input terminal of the speaker system used and the SPEAKER terminal is connected to the "—" speaker input terminal.

DIMENSIONS



UNIT : mm (Inch)
WEIGHT : 61kg (134 lbs 8 oz)

CONNECTION

■ INPUT CONNECTION

● Input Terminals

There are two types of input terminals.

* When using a Cannon connector, use one which matches the XLR-31 or XLR-32 of this unit. The type of connector used (male or female) for the upper and lower sections will depend on the equipment to be connected.
* When a Cannon connector is not used, use the screw type input terminals. Use good quality cord and check that the polarities are correct.

■ GND TERMINAL

If hum or other noises occur, connect a lead from this terminal to the ground terminal of another component.

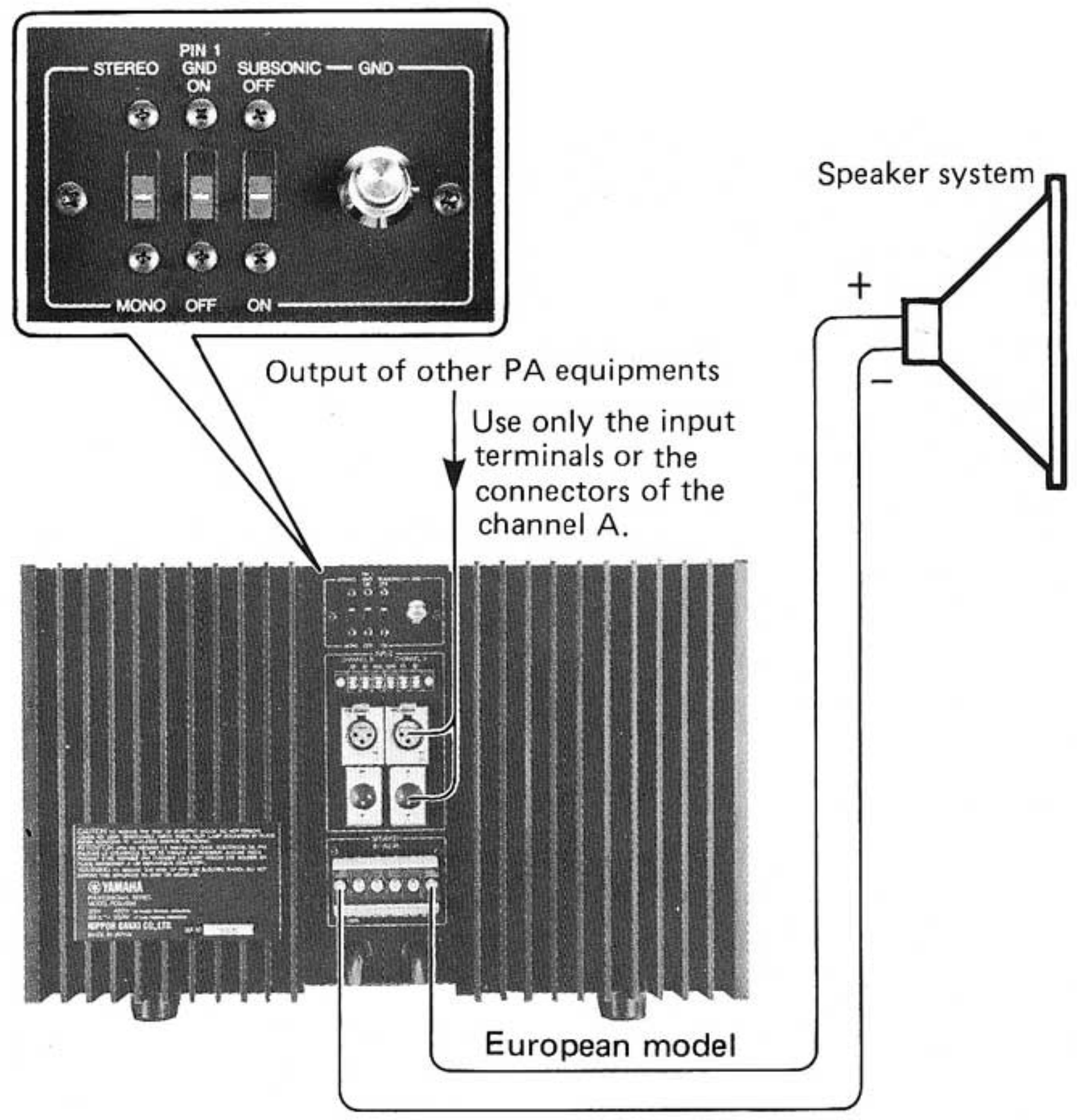
■ SPEAKER CONNECTION

Confirm the phases of the left and right channel speaker cords and connect the four speaker terminals correctly. Use good quality speaker cords. The terminals are pressure attachment types using screws, so each speaker cord should be tightened securely. Check terminals periodically to make sure there is no looseness. Also check that the Stereo/Mono switch is set to Stereo.

- Speaker impedance can be from 8 ohms to 16 ohms. When using more than two speakers, ensure that total impedance is over 8 ohms.
- Refer to the section on BTL operation for BTL connections.

■ POWER CONNECTION

Be sure that both channel A and channel B power switches are off. If power connections are made with the switches on, damage can result. Be sure to fully insert the power plug into the wall outlet. Also, users of the European model should make sure the polarities of the two power plugs match.



■ BTL (BALANCED TRANSFORMER LESS)

When the Stereo/Mono switch on the rear panel is set to Mono, the power amps on both channels are connected in the BTL mode to become a 1500W (8 ohm) monaural power amp.

The BTL system is one in switch the power amplifier circuit operates two sets of SEPP (single ended push-pull) circuits driven in opposite phases, with the load (speaker) connected between the output points. In principle, since the power usage ratio is high, high power can be obtained efficiently even with a low voltage power supply.

By operating the two SEPP circuits individually, they can be used as a stereo amp, or by combining the two circuits and using the BTL mode, they can be used as a monaural power amp.

■ CAUTIONS WHEN USING BTL MODE

● Input terminals

Use only Channel A (on the right side of the rear panel).

● Speaker Connection

Be sure that speakers are connected in phase and that connections are secure.

When connecting for BTL mode, the remaining two negative terminals should not be connected as they are the floating output type without a ground potential for the output. Applicable speaker impedance is from 8 to 16 ohms.

■ POWER CONNECTION

Check to be sure that both channel A and channel B power switches are off.

In the BTL mode operation is monaural, but connect both channel A and channel B and turn on both power switches.

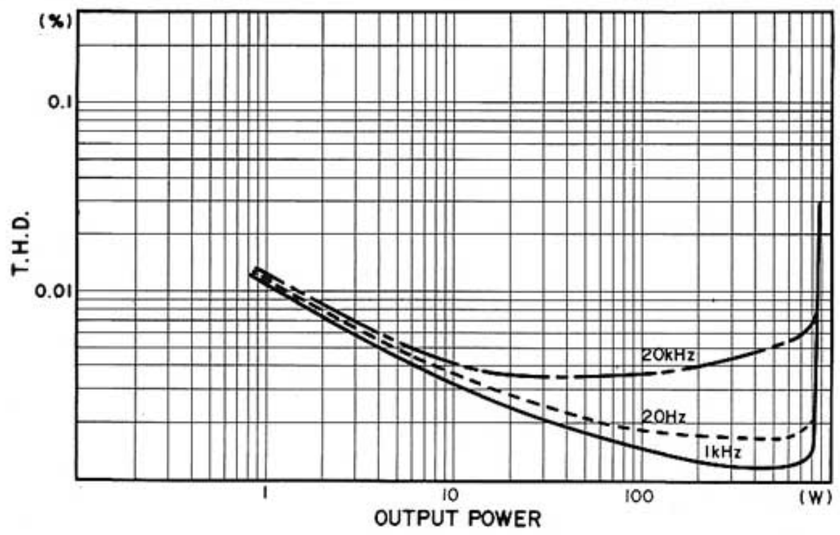
● SEPP circuit

Abbreviation for Single Ended Push--Pull. Through the push/pull action of the two amplifying elements, the direct current (power) is connected linearly and the alternating current (signal) is connected in parallel. Thus, there is only a single output.

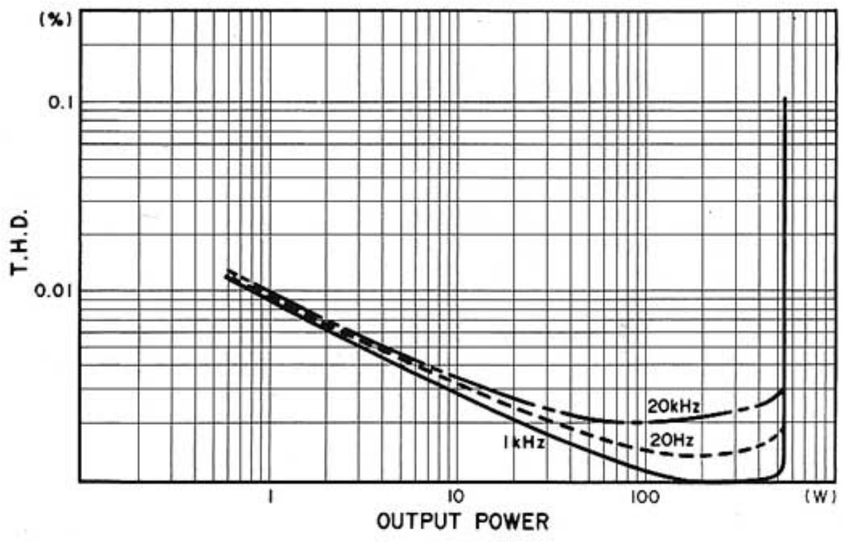
One advantage is direct connection to an 8-ohm speaker system. This circuit is generally used for the output stage of transistor type power amps.

PERFORMANCE GRAPHS

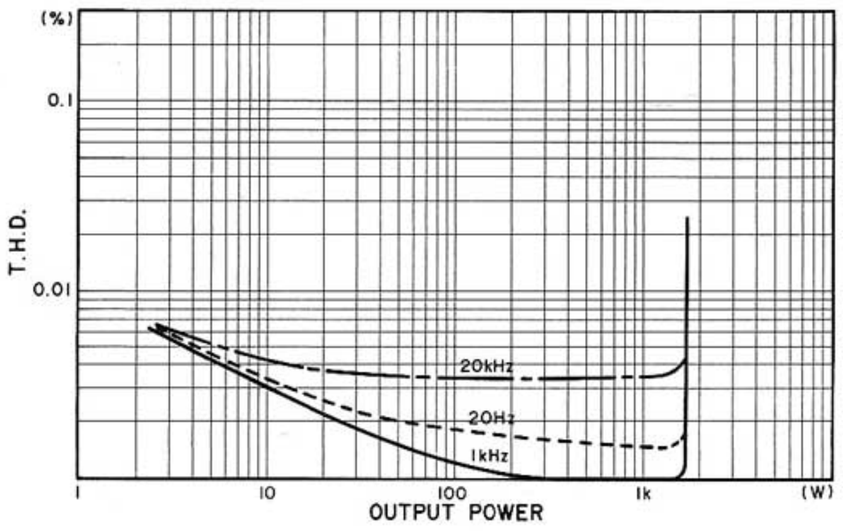
T.H. DISTORTION STEREO RL = 4Ω



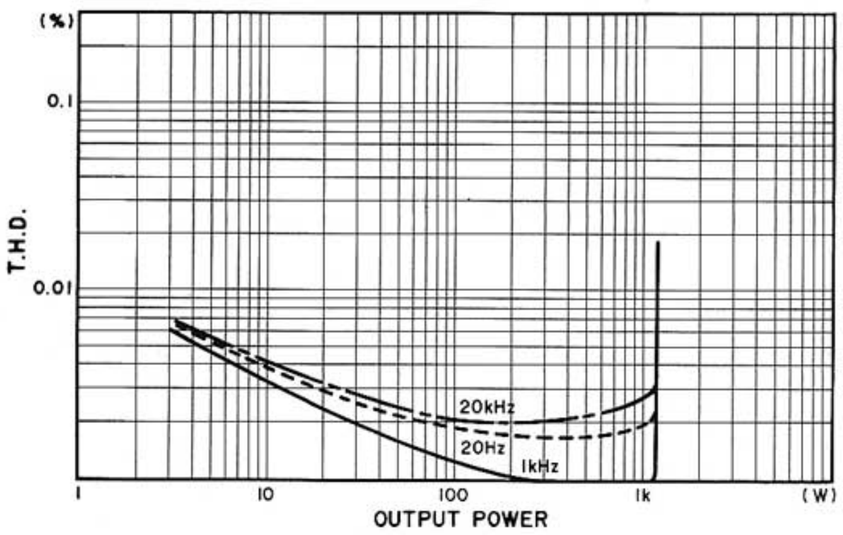
T.H. DISTORTION STEREO RL = 8Ω



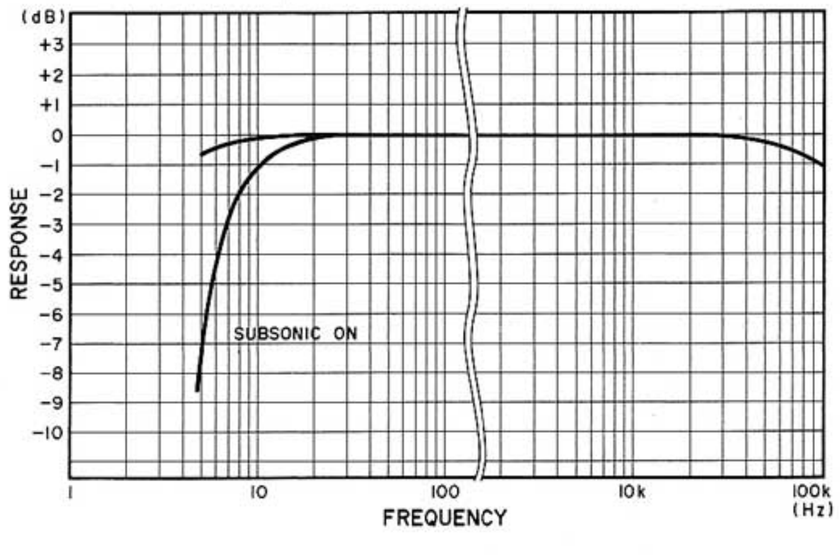
T.H. DISTORTION MONO RL = 8Ω



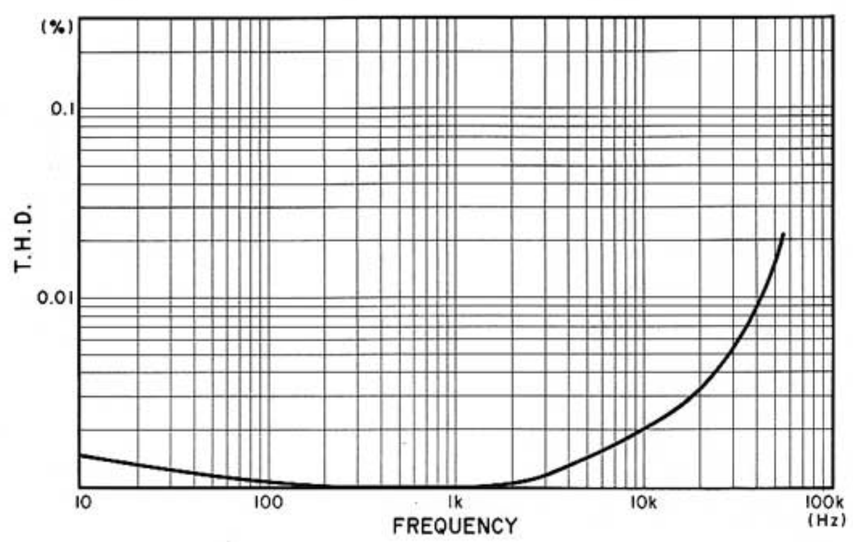
T.H. DISTORTION MONO RL = 16Ω



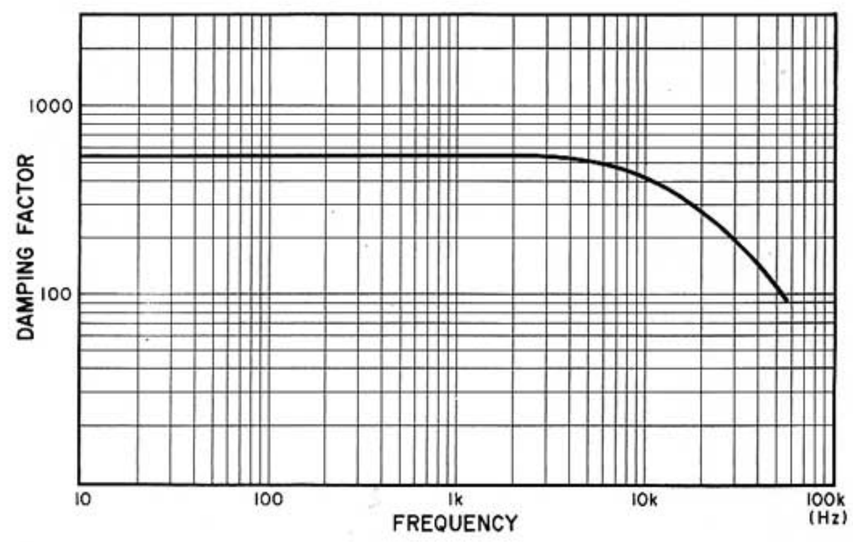
FREQUENCY RESPONSE STEREO RL = 8Ω



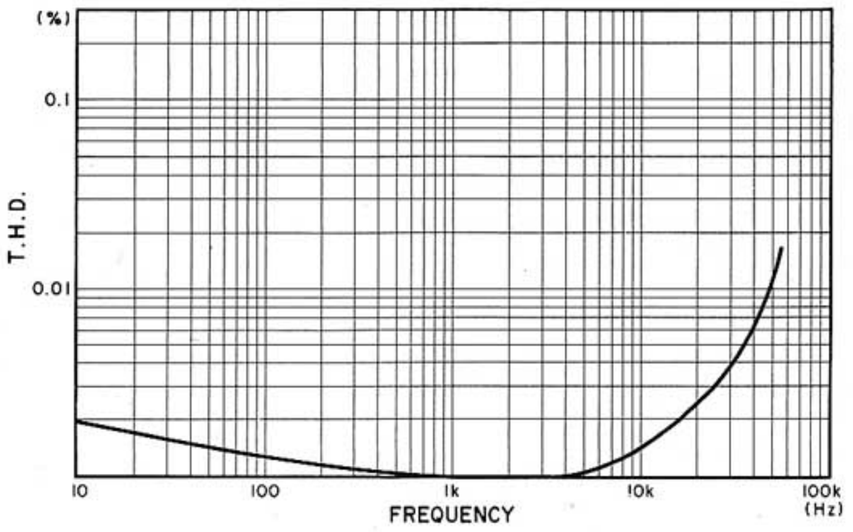
T.H. DISTORTION MONO (BTL) 1500W/8Ω



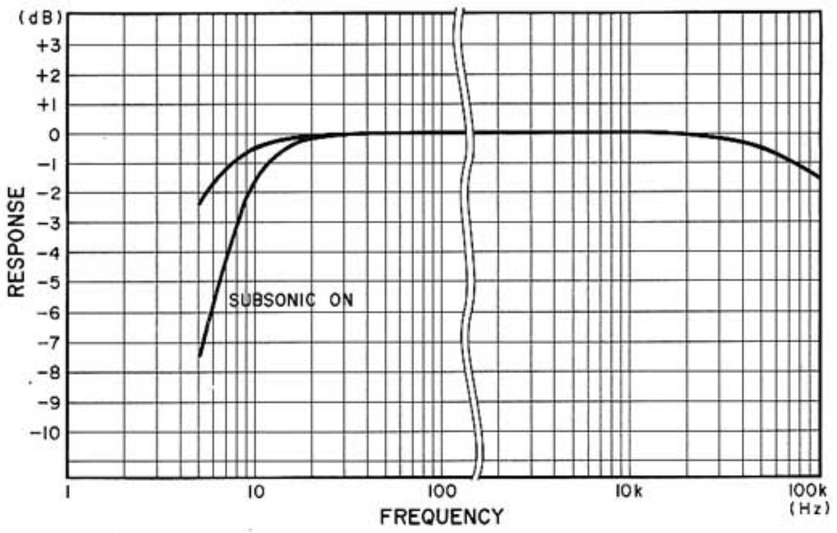
DAMPING FACTOR RL = 8Ω



T.H. DISTORTION STEREO 500W/8Ω

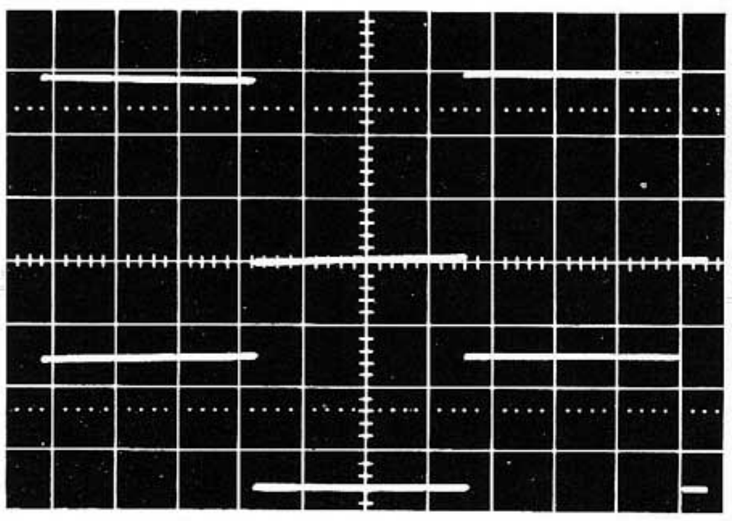


FREQUENCY RESPONSE MONO RL = 8Ω

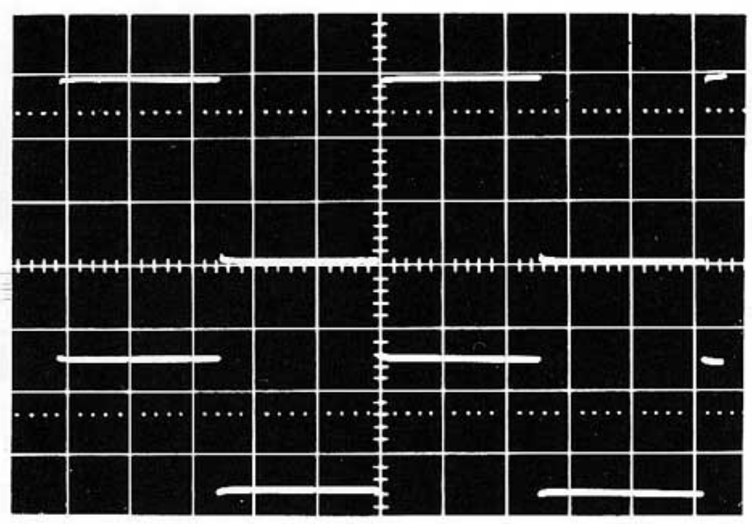


PERFORMANCE OSCILLOGRAPHS

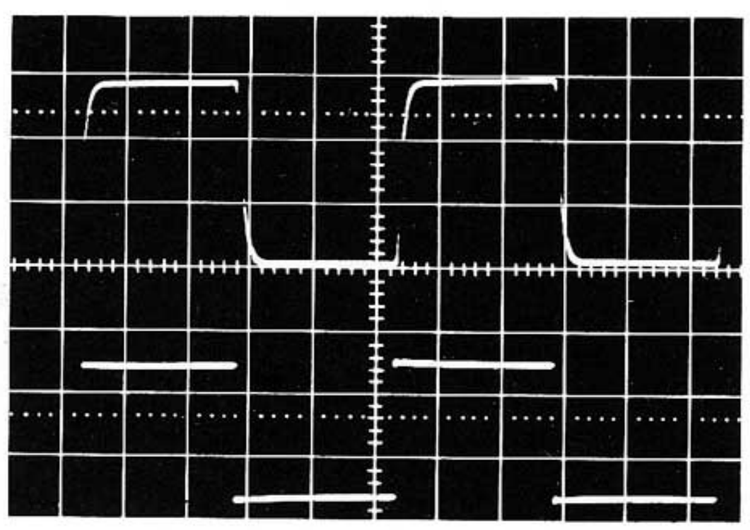
SQUARE-WAVE RESPONSE both cH driven RL = 8Ω [OUTPUT V = 50V/div
INPUT V = 2V/div



[20Hz]

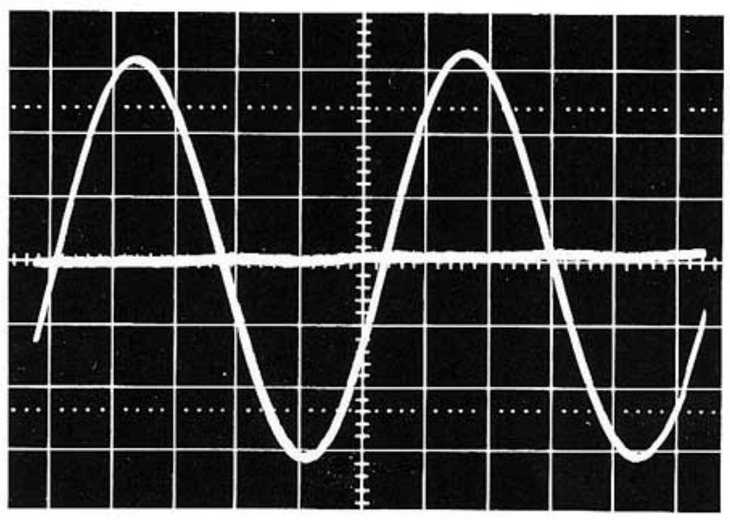


[2kHz]

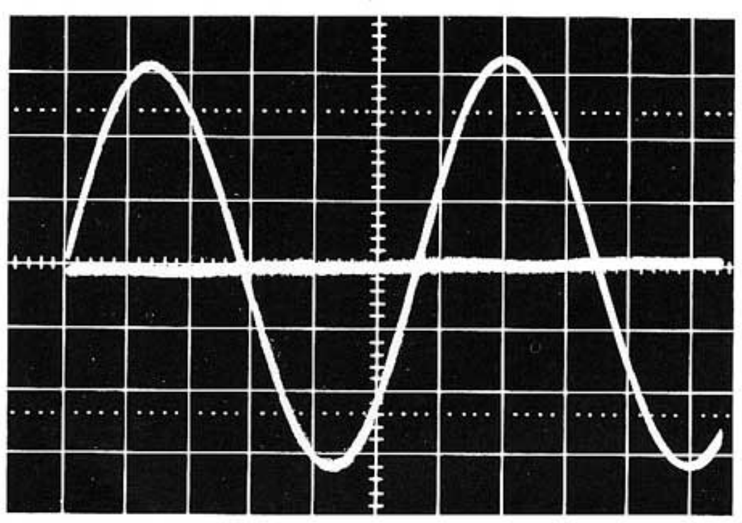


[20kHz]

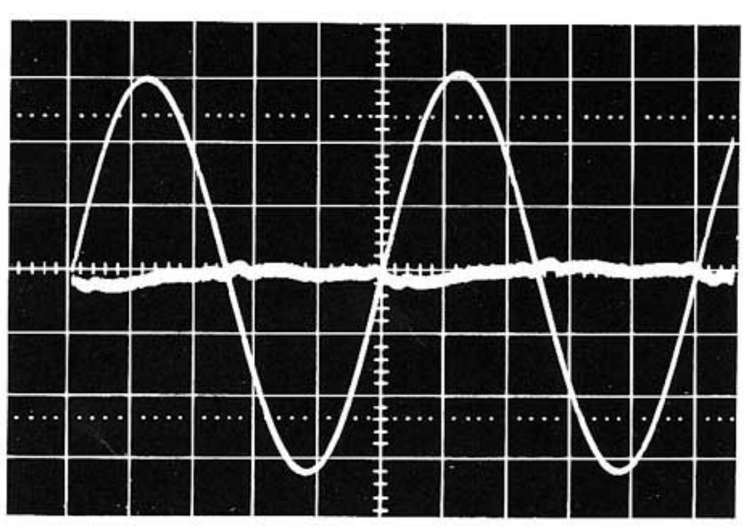
SINE WAVE SIGNAL BOTH CHANNEL DRIVEN RL=8Ω OUTPUT POWER 250W



[20Hz] THD 0.0013%

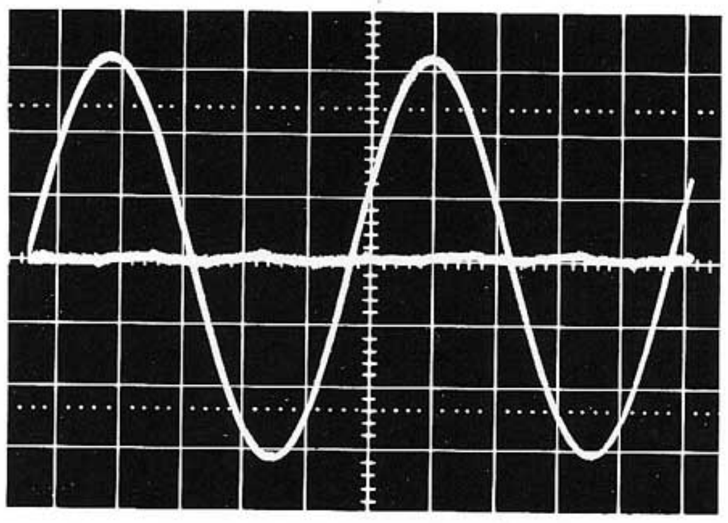


[1kHz] THD 0.0012%

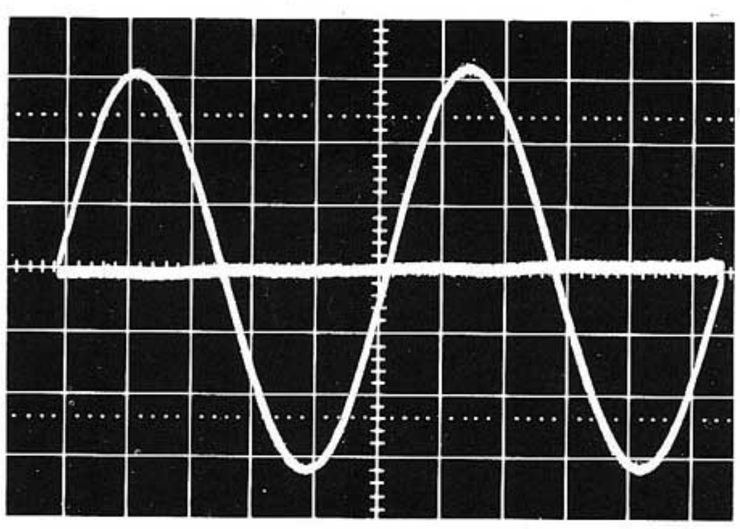


[20kHz] THD 0.0025%

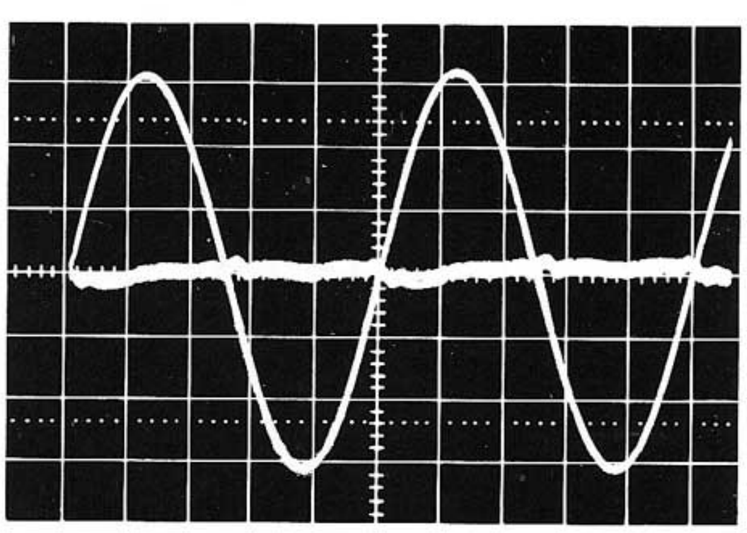
MONO (BTL) RL = 16Ω OUTPUT POWER 500W



[20Hz] THD 0.0013%

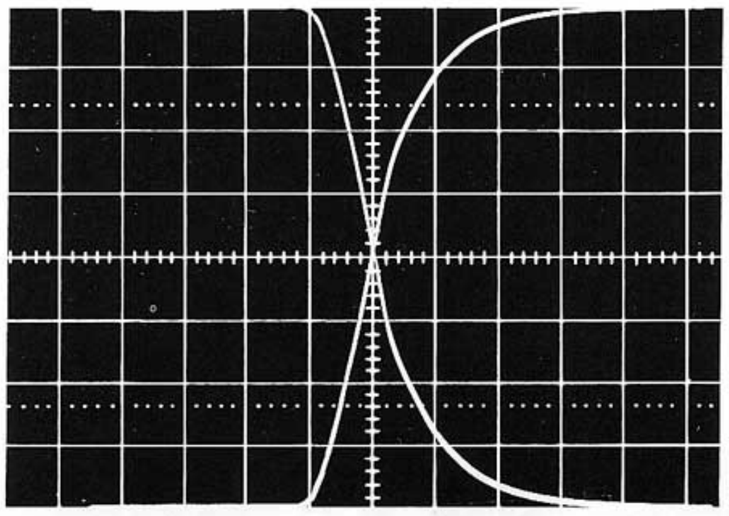


[1kHz] THD 0.0012%

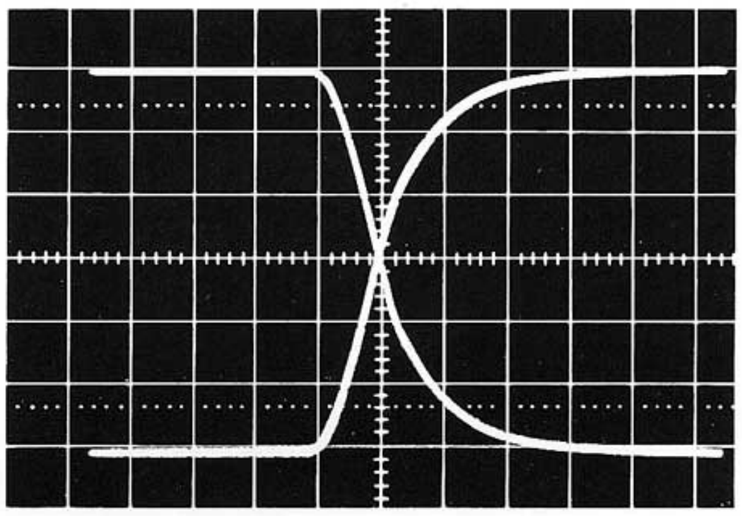


[20kHz] THD 0.003%

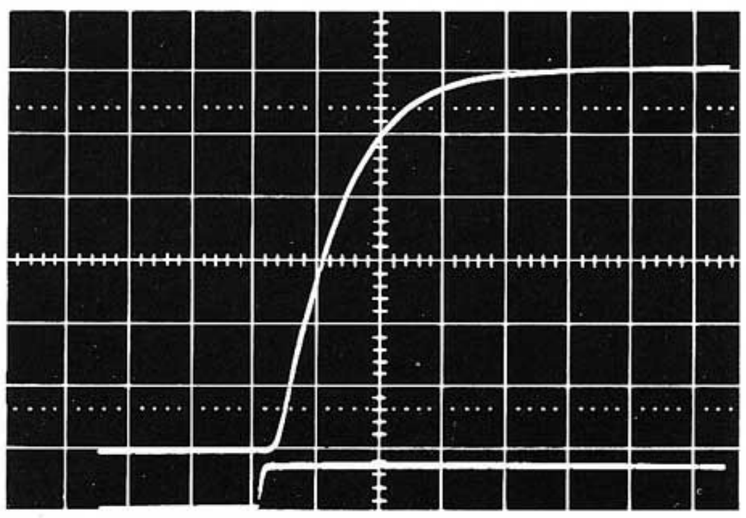
SLEW RATE both CH driven RL = 8Ω V = 20V/div H = 1μSec/div



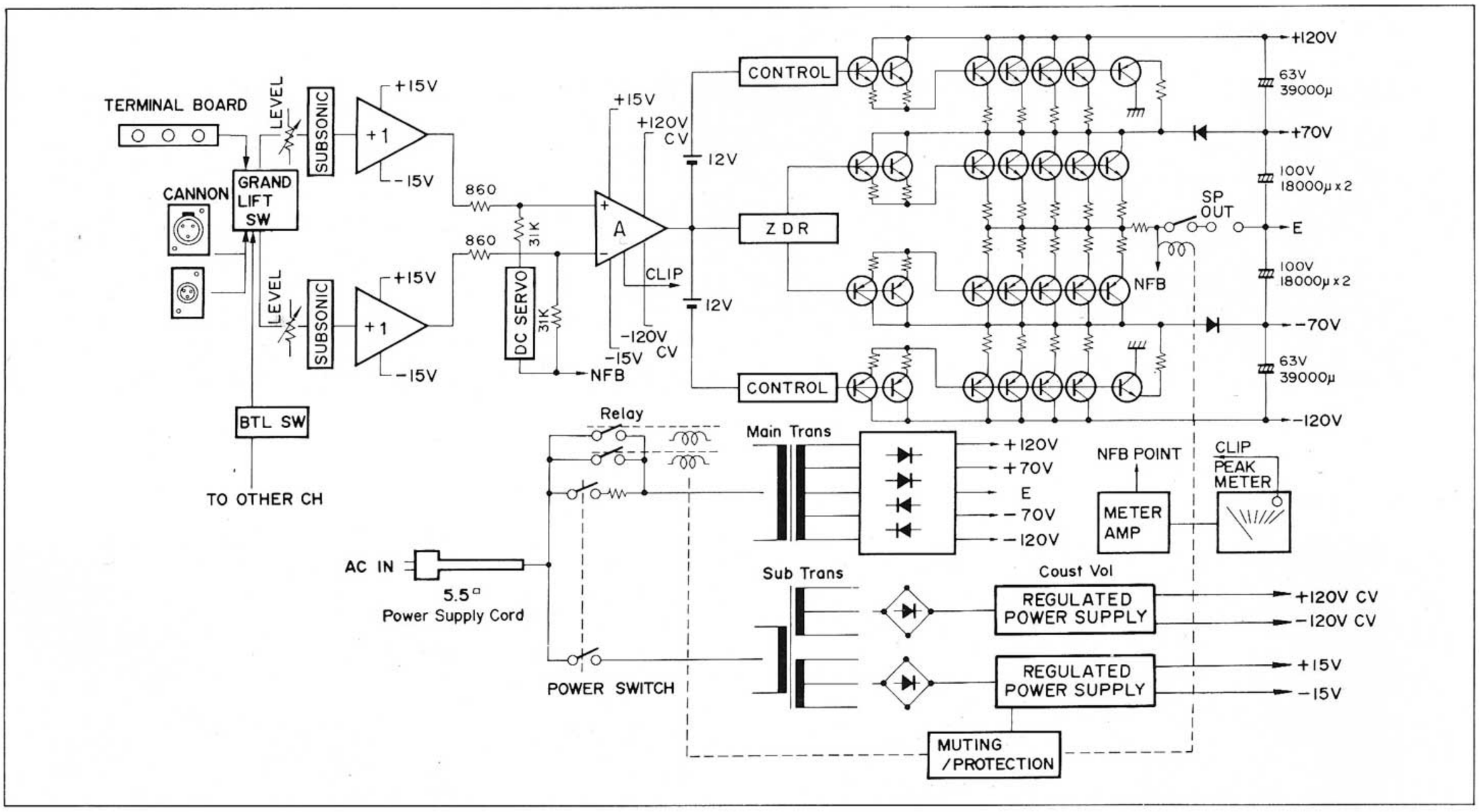
SLEW RATE MONO (BTL) RL = 16Ω V = 50V/div H = 1μSec/div



RISE TIME bath CH driven RL = 8Ω V = 1Vp-p H = 1μSec/div



BLOCK DIAGRAM



SPECIFICATIONS

POWER OUTPUT LEVEL	
0.003% THD, 20Hz to 20kHz	
Stereo, 8 ohms	500W + 500W
0.01% THD, 20Hz to 20kHz	
Stereo, 4 ohms	750W + 750W
Mono (BTL), 8 ohms	1500W
Mono (BTL), 16 ohms	1000W
POWER BAND WIDTH	
0.1% THD, 8 ohms, 250W	10Hz to 100kHz
INPUT SENSITIVITY/IMPEDANCE	
8 ohms, 500W	1.73V (+7dB)/25k ohms
FREQUENCY RESPONSE	
10Hz to 100kHz, 8 ohms, 1W	$^{+0}_{-3}$dB
FILTER CHARACTERISTICS	
Subsonic	7Hz, −12dB/oct
S/N RATIO	
IHF-A Network, 8 ohms	122dB
TOTAL HARMONIC DISTORTION	
8 ohms, 250W, 20Hz to 20kHz	Less than 0.003%
INTERMODULATION DISTORTION	
70Hz 70kHz Mixed	
8 ohms, 250W	Less than 0.002%
DAMPING FACTOR	
8 ohms 1kHz	500
POWER REQUIREMENTS	AC120V 60Hz (U) AC220/240V, 50/60Hz (E)
FUSE	15A 250V (U) 6.3AT 250V (E)
POWER CONSUMPTION	500W/ch (U) 350W/ch (E)
DIMENSIONS (W x H x D)	19" x 10-3/8" x 17-7/8" (482 x 264 x 441 mm)
WEIGHT	134 lbs 8 oz (61 kg)

All specifications subject to change without notice.

SINCE 1887 YAMAHA
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

OMD-64 8430.5 Printed in Japan